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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/715,363

11/19/2003

Toshihiro Koyama

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EXAMINER

RUTHKOSKY, MARK

ART UNIT

PAPER NUMBER

1795

NOTIFICATION DATE

DELIVERY MODE

07/15/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No. 10/715,363	Applicant(s) KOYAMA ET AL.	
	Examiner Mark Ruthkosky	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response after Non-Final Rejection

Applicant remarks filed 4/8/2008 have been entered into the application file.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kizu et al. (US 2003/0165739) in view of Takami et al. (US 5,753,387) and further in view of Ohsaki et al. (US 5,856,043) OR over Ohsaki et al. (US 5,856,043) in view of Kizu et al. (US 2003/0165739) and further in view of Takami et al. (US 5,753,387)

Kizu et al. (US 2003/0165739) teaches a negative electrode for a non-aqueous secondary cell comprising a graphite active material (p. 128), a conductive material including carbon black (p. 141) and a binder (p. 132; p. 128-141.) Graphite is taught as the active material. The lattice spacing is preferably 0.3355-0.3380 (p. 132.) The specific surface area is preferably 1.5-3 m²/g (p. 154.) Carbon black is used as a conductive material. The conductive material is preferably less than 1 µm (p. 60-71) and 5 µm (p. 141.) The amount of binder material is preferably 3-8% (p. 159.) The negative electrode material comprises particles having an aspect ratio of 1.0 to 5.0 and a largest particle size of 10 µm or less. The preferred particle size is 5-10 microns (p. 137

Art Unit: 1795

and 141.) The reference teaches the battery in an electronic device (col. 1.) The reference is silent to and thus does not teach the electrode to include an aqueous binder. The reference does not teach the density of the negative electrode.

While the references teach that carbonaceous materials of the electrode having a density of at least 1.5 g/cm^3 , the references are silent to and thus do not disclose the density of the negative electrode. Ohsaki et al. (US 5,856,043) teaches a negative electrode for a non-aqueous secondary cell comprising graphite, carbon black and a binder (col. 3, line 40 to col. 6, line 30; col. 4, lines 23-30; col. 5, lines 1-20; col. 6, lines 25-30), wherein said carbon black comprises particles having an aspect ratio in the range of 1.0 to 5.0 and a largest particle size of 1-10 and preferably 2-5 μm , wherein said negative electrode has a density of preferably $1.5\text{-}1.8 \text{ g/cm}^3$ (col. 7, lines 5-15.) The references do not teach an aqueous binder.

Takami et al. teaches a lithium secondary battery comprising graphite, an amorphous carbon and a binder (col. 4, line 61 to col. 6, line 15; and cols. 7-9, line 5.) Carbon black is an amorphous carbon material. The lattice spacing is preferably not more than 0.340 and the density is 1.8 g/cm^3 (col. 8, line 22.) The specific surface area is preferably $0.1\text{-}5 \text{ m}^2/\text{g}$ (col. 7, line 1-10.) The negative electrode material comprises particles having an aspect ratio of 2.0 to 10.0. The preferred particle size is 5-10 microns. CMC and SBR binders are noted. The reference teaches mixing and pressing the electrode materials (col. 17, lines 50-55.) The reference teaches the battery in an electronic device (col. 1.)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the binders taught in Takami et al. in the battery of Kizu et al. (US 2003/0165739) and Ohsaki et al. (US 5,856,043) in order to bind the electrode materials in the

Art Unit: 1795

form of an electrode. The reference shows that these materials effectively bind the electrode materials in a lithium battery.

Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to prepare a negative electrode having a density of at least 1.5 g/cm^3 because the prior art recognizes that if the packing density is too low, the electric conductivity of the electrode becomes lowered and advantages in load characteristics and safety are lost ('043, col. 7, lines 5-15.) The artisan would have found the claimed invention to be obvious in light of the teachings of the references.

Response to Arguments

Applicant's arguments filed 4/8/2008 have been fully considered but they are not persuasive.

Applicant argues that the Kizu reference is deficient in its teachings. Applicant notes that the reference teaches the claimed invention but does not teach aqueous binders or the claimed electrode density. Applicant notes the teaching that "binders are noted", but states that no specific binders are noted." This was acknowledged in the rejection. The teaching of Kizu merely shows that binders are present with the electrode materials. With regard to the statement that the amount of conductive material is preferably 2.2-8%, this was a typographical error. The statement has been corrected to read that the amount of binder is 3-8% (p. 159.) Again, this merely shows that binder is used in the negative electrode of Kizu.

With regard to the particle size, the Kizu reference teaches the particle size of the conductive carbon black to be not more than 5 microns (141.) Applicant argues that paragraph

Art Unit: 1795

[0137] relates to the average fiber length and the aspect ratio of graphite fibers, which is preferable in view of the coatability thereof when the graphite fibers are used as a negative electrode active material and not those of the carbon black conductive material. This argument is not persuasive. The reference refers to both materials since each form the coating that forms the electrode (128.) The conduct material may be graphite, carbon black and the like (141). Further, if the average particle size of the conductive material is 5 micron particle, then the aspect ration is simply 1.

Applicants argue that they cannot understand what is meant by "[A]s the size of the carbon black conductive material is not to be more than 5 μm , the ratio of the particles of carbon black is greater than 10%." (See page 3, lines 9-10 of the Office Action.) This statement has been removed from the rejection

Applicants argue that Ohsaki et al. US '043 describes in the paragraph bridging columns 4 and 5 that "(W)hen the average aspect ratio is within the range, electric conductivity of the electrode itself becomes increased. Thus, addition of the materials for improving conductivity can be obviated and a non-aqueous electrolyte secondary battery with improved safety can be provided. Applicants argue that the reference teaches away from using a conductive material.

This argument is not persuasive. Ohsaki et al. (US 5,856,043) teaches a negative electrode for a non-aqueous secondary cell comprising graphite, carbon black and a binder (col. 3, line 40 to col. 6, line 30; col. 4, lines 23-30; col. 5, lines 1-20; col. 6, lines 25-30), wherein said carbon black comprises particles having an aspect ratio in the range of 1.0 to 5.0 and a largest particle size of 1-10 and preferably 2-5 μm , wherein said negative electrode has a density of preferably 1.5-1.8 g/cm^3 (col. 7, lines 5-15.) The rejection notes that it would have been

Art Unit: 1795

obvious to one of ordinary skill in the art to prepare a negative electrode having a density of at least 1.5 g/cm^3 . Ohsaki recognizes that if the packing density is too low, the electric conductivity of the electrode becomes lowered and advantages in load characteristics and safety are lost ('043, col. 7, lines 5-15.) The paragraph noted by applicant shows that the prior art recognizes that when the conductivity of the electrode is low, a conductor may be used to improve the electrode. Thus, the reference does not teach away from using a density of preferably $1.5\text{-}1.8 \text{ g/cm}^3$ (col. 7, lines 5-15.)

Applicant argues that the Takami et al. reference US '387 is silent to the addition of a conductive material to the negative electrode. Conductive materials are taught in the cited references of Kizu et al. and Ohsaki.

Applicant argues that aqueous binders have a larger binding effect than non-aqueous solvents, but that a larger binding effect may have an adverse effect in some embodiments. This argument is not persuasive. The cited prior art teaches both aqueous and nonaqueous solvent type binders. Each type is used in a carbonaceous anode of a lithium battery. Thus, one skilled in the art would recognize that either type of binder may be used in such an electrode in order to achieve the desired binding properties for the electrode. With regard to the newly added limitation that the negative electrode has a density of at least 1.5 g/cm^3 , the new rejection of record addresses this limitation.

Applicants conclude that the present invention would not have been obvious from any combination of Kizu et al US '739, Ohsaki et al. US '043 and Takami et al. US '387 because one would find no reason or rationale that would allow them to arrive at the instant invention as claimed. This is not persuasive. As noted in the rejection, one of ordinary skill in the art would

Art Unit: 1795

be motivated to use the binders taught in Takami et al. in the battery of Kizu et al. (US 2003/0165739) and Ohsaki et al. (US 5,856,043) in order to effectively bind the electrode materials in a lithium battery. Further, one of ordinary skill in the art would be motivated to was prepare a negative electrode having a density of at least 1.5 g/cm^3 because the prior art recognizes that if the packing density is too low, the electric conductivity of the electrode becomes lowered and advantages in load characteristics and safety are lost ('043, col. 7, lines 5-15.) The artisan would have found the claimed invention to be obvious in light of the teachings of the references.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free.)

/Mark Ruthkosky/

Primary Examiner, Art Unit 1795